

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/IL04/001072

International filing date: 22 November 2004 (22.11.2004)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/524,802
Filing date: 25 November 2003 (25.11.2003)

Date of receipt at the International Bureau: 28 December 2004 (28.12.2004)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland
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1204/1072

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APPLICATION NUMBER: 60/524,802

FILING DATE: November 25, 2003

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

ER 526816829 US

INVENTOR(S)					
Given Name (first and middle (if any))		Family Name or Surname		Residence (City and either State or Foreign Country)	
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<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
METHOD AND SYSTEM FOR SPEEDING UP DATA INPUT TO A COMMUNICATION SYSTEM					
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification		Number of Pages		29	
<input checked="" type="checkbox"/> Drawing(s)		Number of Sheets		6	
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76		<input type="checkbox"/> CD(s), Number			
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METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.				FILING FEE AMOUNT (\$)	
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Respectfully submitted,

SIGNATURE

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Date 11/25/2003

REGISTRATION NO.
(if appropriate)
Docket Number:

40,819

12003.0010

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Effective 10/01/2003. Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT** (\$ 80.00)**Complete if Known**

Application Number	
Filing Date	Nov. 25, 2003
First Named Inventor	RADOM et al.
Examiner Name	
Art Unit	
Attorney Docket No.	12003.0010

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Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	80.00
SUBTOTAL (1)			(\$ 80.00)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 86	2201 43	Independent claims in excess of 3	
1203 290	2203 145	Multiple dependent claim, if not paid	
1204 86	2204 43	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)			(\$ 0)

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FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

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SUBTOTAL (3) (\$ 0)**SUBMITTED BY**

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Date Nov. 25, 2003

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US PROVISIONAL PATENT APPLICATION

TITLE:

**METHOD AND SYSTEM FOR SPEEDING UP DATA INPUT TO A
COMMUNICATION SYSTEM.**

THE INVENTORS

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ZALTZMAN, Ori, 2 Ha-Shoshone St., Hazily, IL 46498

BACKGROUND

1. FIELD OF INVENTION:

[0001] The present invention relates to the field of data entry method and, more particularly, to automated word completion systems for composing a text message.

2. DESCRIPTION OF BACKGROUND ART:

[0002] During recent years, text message communications have experienced dramatic growth in popularity and use. The advantage of text message communications that has augmented this growth is the availability of quick and easy communication between widely disparate individuals and networks. The communication may be between a pair of friends, relatives or coworkers, and also between strangers and groups of strangers. The text messages may be used also for commercial purposes such as ordering services, voting, etc.

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[0003] The text communication may be done over the Internet using instant messages and chat rooms, via cellular telephone using Short Message Service (SMS), or via digital TV using interactive television services, etc.

[0004] A problem with using text communication via cellular telephone, interactive TV, palm computers, etc. is that those devices are frequently difficult to use for text entry. Generally, those devices have space-limited keyboards (typically a 0-9 numeric keypad plus several additional function keys). Entering a text message via a space-limited keyboard is often confusing and difficult.

[0005] There are several methods that face the challenge of accelerating text communication via cellular or interactive TV. For example, US patent number 6,519,771 discloses a method for creating a message to a chat room over interactive TV. The method offers a limited number of predetermined responses to the television or video content. The predetermined responses are prepared in advance by the user or may be standardized responses that are broadcast to many user interface devices. The user can select the appropriate predetermined message. Having the predetermined responses available allows for interactive communication without the need for a keyboard to type the message.

[0006] Another method is disclosed in US patent application number 09/987,218 having the publication number US2003/0090518. This application discloses a method for automatically forwarding and replying with a short message. By using this method a local user can select a message from one of a plurality of pre-established reply messages. The user may modify the selected message or send it as is. Moreover, a structuralized, modularized and hierarchy menu is provided to the local user in order to define a group of pre-established reply messages that may fit the user's needs.

[0007] However, those methods offer limited communication since the user is limited to pre-established and/or predetermined reply messages, and the user cannot create his preferred message.

[0008] There are some methods for accelerating entering of text data by offering word completion, such as the methods that are disclosed in patents numbers US 6,405,060, US 6,377,965, or US 4,374,625. Those methods may be divided into two groups depending on the type of thesaurus that is used for offering a list of words. The thesaurus that is used in the first group is unique for each user and is created by the user. This thesaurus is updated from time to time according to the usage of the words by the user. This group of methods is limited to the past experience of the user and cannot benefit from the usage and the experience of other users.

[0009] The other group of methods uses a thesaurus that is prepared in advance by a third party. This thesaurus may be based on a large number of users and may offer words that were not used by the user himself. However, the thesaurus of those methods is fixed and is not updated from time to time.

[0010] Moreover, a common device with a limited-space keyboard may have limited free storage place, since its main application is other than text communication, and a storage location for a large thesaurus is not one of its objectives. For example, a cellular phone is used mainly for audio communication; a digital receiver or a TV set-box usually is used for receiving and processing digital TV signals, etc.

[0011] Therefore, there is a need in the art for a new method of accelerating the input of text messages in a device with a space-limited keyboard and limited storage capabilities, a method that may load, upon need, a dynamically and continuously updated thesaurus with the most likelihood words to be tapped by a user during the current application.

SUMMARY OF THE INVENTION

[0012] The present invention solves the above-described needs by providing a method that may offer word completion by offering a list of words from which the user may select the appropriate one, if it exists. The list is selected from a thesaurus according to the character that has been tapped by the user. The list may have a flexible number of words, depending on the frequency of usage of the character that has been tapped. The number of words may be varied from one to few words, such as, but not limited to, three, five or seven words. The list may contain terms, phrases, slang and alpha-numeric combinations (e.g. '4U'). The thesaurus may depend upon the topic of the communication. Furthermore, the thesaurus is dynamically and continuously updated according to the current communication transportation that is created by participants sharing the same topic. The appropriate thesaurus may be loaded to the user's communication device by the service provider upon selecting the topic of the communication or upon joining a chat room.

[0013] Usually, a chat room is related to a particular topic, with participants attracted to that chat room by their interest in the topic. Therefore, communication between participants in a chat room or a forum, in the case of interactive TV communication, may frequently share common data terms such as words, terms, abbreviations, expressions and other combinations of alpha-numeric characters and signs. The appearance of those frequent words may be changed over time, depending on the most popular or the most recent event that is relevant to the topic.

[0014] An exemplary embodiment of the present invention may comprise a text message server that may reside in the communication service provider's premises. The text-message server handles the text message communication

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transportation. The server, in parallel to transferring the text messages to its destination, may store the text messages in an appropriate database from one or more databases. Each database is associated with a topic or chat room or any other type of subject (or group). They may include subjects such as, but not limited to, profession, business, sex, age, etc. It should be noted that the terms "topic", "forum", "subject", "group" and "chat room" are used interchangeably herein. Henceforth, the description of the present invention may use the term 'topic' as a representative term for any of the above group.

[0015] In another exemplary embodiment the database may receive input from additional sources such as, but not limited to, another database that may contain a thesaurus of words that are frequently used in text messages or from another topic that is close to the topic of the database; in some cases, words may be added manually by the service provider, etc.

[0016] From time to time, in a continuous mode, a statistical processor may analyze the data in each one of the databases and may define for each database a current thesaurus that fits the topic that is associated with that database. The current thesaurus of a topic may contain the words, which are most frequently used in this topic. A thesaurus may contain words in more than one language, slang, unique terms such as '4U' that is often used instead of 'For You', etc. Then the current thesaurus of a topic is stored in a bank of thesauri, and the statistical processor may process the database of the next topic. The number of words in the current thesaurus of a topic can be a fixed number or can be configured according to the topic. An embodiment of the present invention may have more than one thesaurus per topic. Those thesauri may differ from each other by their size (number of words). The size of each one of them may be defined by the type of equipment that is used by the user.

[0017]

An exemplary communication device at the user location may have an agent that communicates with the text message server. Upon initiating a text communication session, the agent may automatically define the topic of the session, for example, by the chat room or the destination address, etc. The agent may prompt the user to define the topic of the communication or the chat room that the user would like to join, or the user may define the topic without being prompted. Based on the topic of the session, the agent may load the appropriate thesaurus from the service provider premises. In some embodiment, in which the thesaurus is an integral part of the user's equipment, the agent may update the thesaurus with the latest version, if needed.

[0018]

The method of transferring the appropriate thesaurus from the server to the equipment of the user may depend on the type of communication network that is used. For example, in case of interactive TV, the bank of updated thesauri is transferred to a broadcast server. The broadcast server may use a carousel transmitting method for broadcasting the plurality of thesaurus. The carousel transmitting method is a method for broadcasting a plurality of applications or data in a cyclic mode over a digital TV broadcasting network. The agent may wait for the appropriate thesaurus. Upon receiving the appropriate thesaurus, the agent stores the whole thesaurus or a portion of the thesaurus according to the available storing volume that may be used for this application. The size of the stored thesaurus may be configured according to the device.

[0019]

In another exemplary embodiment, the agent may communicate with the text message server and request the appropriate thesaurus. The communication may be done over the return channel of the interactive TV, or, for example, in cellular communication it may be done via a cellular data connection. In both cases the communication may be based on Internet Protocol (IP).

[0020]

The agent may start following the user's keystrokes. In response to a keystroke an entry in the thesaurus that matches the keystroke is searched. The matched entry in the thesaurus may comprise a list of completion suggestions that may complete the relevant keystroke. If a match entry is found, then the list of completion suggestions is displayed to the user as a pop-up list box, typically under and to the right (or to the left, depending on the writing direction that is utilized in the used language) of the partial data entry. The list may have a flexible number of words, depending on the frequent of usage of the current keystroke. The number of words may be varied from one to few words, such as, but not limited, to three, five or seven words. The completion suggestions are positioned in the list based on a computed indication of likelihood of being correct. The user may accept one of the suggested completions or may continue entering the data item. Acceptance may be done by touching a pointing device to the display screen over the position of the desired completion suggestion, or by using traditional selection and acceptance keystrokes, such as the "arrow" keys to select a completion suggestion and the "enter" key to accept the selected completion suggestion. The term 'keystroke' represents entering of data or instruction by the user. It can be by carried out tapping a key in a keypad or a keyboard or it may be by pointing a soft key that is displayed on the user's display or via a voice command.

[0021]

The present invention supports the current needs of the art by disclosing a method that accelerates text and/or data entering. The method uses a statistical thesaurus that is built dynamically and is updated continuously from text collection from a plurality of users communicating on the same topic.

[0022]

An embodiment of the present invention may be used off line too. A user may download one or more updated thesauri and save them in the user's device. Then the user may add additional words to the thesaurus and use the thesaurus

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while typing. From time to time the user may update, replace or add a thesaurus, transfer copies of his thesauri to others, etc.

[0023] Other objects, features, and advantages of the present invention will become apparent upon reading the following detailed description of the embodiments with the accompanying drawings and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a block diagram of a communication system that uses an exemplary embodiment of the present invention for accelerating text entry.

FIG. 2 illustrates a block diagram of a communication module in the user equipment that uses an exemplary embodiment of the present invention for accelerating text entry.

FIG. 3 is a flow diagram showing an exemplary method for handling one or more text message databases.

FIG. 4 is a flow diagram showing an exemplary method of operation of a statistical processor module; and

FIGS. 5a & 5b is a flow diagram showing an exemplary method for accelerating text entry.

DETAILED DESCRIPTION OF THE INVENTION:

[0024] Turning now to the figures in which like numerals represent like elements throughout several views, exemplary embodiments of the present invention are described. For convenience, only some elements of the same group may be labeled with numerals. The purpose of the drawings is to describe exemplary embodiments and not for production. Therefore, features shown in the figures are chosen for convenience and clarity of presentation only.

[0025] FIG. 1 illustrates a block diagram with the relevant elements of a communication system 100 that uses an exemplary embodiment of the present invention for accelerating text entry. The communication system 100 may comprise service provider premises (SPP) 120, a plurality of user equipment 110a-c, communication channels 142 and 144 between the SPP 120 and the plurality of user equipment 110a-c, external network 150 and an IP connection 152 between the external 150 and the SPP 120. Three user equipments 110a-c are shown in Fig. 1 by way of example, and any number other than three may be used with the present invention. The external network 150 may be the Internet.

[0026] Each example of the user equipment 110a-c may comprise a display 112, a character input device 114, and a communication module 116. User equipment 110a-c may have audio capabilities (not shown in the drawings) to communicate with the user, in addition to the display. User equipment 110a-c may be a single device with internal modules or may be a system comprising separated devices. In a case in which the communication system 100 is digital TV equipment (interactive TV), then the display 112 is the TV screen, the communication module 116 may be a digital TV receiver such as the set-

top box, and the character input device 114 may be the remote control of the TV receiver. Usually the communication between the remote control 114 and the set-top box 116 is wireless communication. A common wireless method may use Infra Red IR medium, Bluetooth or RF.

[0027]

Other types of user equipment 110a-c may be used. For example, in a cellular system the user equipment may be a single device having internal modules. The display 112 may be the alphanumeric or graphical display of the cellular phone, the character input device 114 is the dialing keypad, and the communication module 116 is the internal circuitry of the cellular phone. In a case in which the user equipment 110a-c is a laptop, a PDA such as a handheld computer, a palm computer, an Internet appliance or other device having the communications, processing and display capabilities for performing the present invention. Those devices may use a display 112 that is a flat panel graphical display. The character input device 114 may be a writing pen or a touch screen display, etc. In some embodiments the character input device 114 may be a common QWERTY keyboard. The terms 'character input device', 'keyboard', 'limited-space-keyboard' and 'keypad' may be used interchangeably throughout the application. Henceforth, the description of the present invention may use the term 'keypad' as a representative term for any of the above group. More information about the operation of user equipment 110a-c is disclosed below in conjunction with FIG. 2, and FIGS. 5a & 5b.

[0028]

Communication channels 142 and 144 may carry digital data among other types of communication transportation, depending on the type of system 100. Usually the data transportation over 142 & 144 is based on IP protocol. Communication channels 142 and 144, which may be combined or separated, each one of which may take the form of plane communications, such as, but not limited to, telephone

[0030] In an exemplary embodiment that is used in a cable digital TV network, both channels 142 & 144 and the TV broadcasting signals may be transferred by single cable coupled to a cable modem. In another embodiment, the television broadcasts and an Internet connection 144 may be provided by a satellite communication, while the back channel 142 may be provided by another communication channel such as a telephone connection.

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(SP) 134 and the bank of thesauri (BOT) 136 may reside in the TMS 124. All the elements may be connected over a Local Area Network (LAN) (not shown).

[0032] Transmitter 126 may transmit the common information that is delivered by the service provider 120 with text messages to users 110a-c. In a digital TV premise, the transmitter 126 may be a satellite transmitter or a cable transmitter, depending on the communication network that is used. In a cellular operator's premise, the TX 126 may transmit the common cellular communication with text messages.

[0033] RX 122 is used to receive the back channel carrying the text messages from users 110a-c. In a satellite digital TV premise, the RX 122 may be an Internet access module that is connected to the Internet via a common connection. For a cable TV premise, RX 122 may be a cable modem that is adapted to accept Internet Protocol data communication. In a cellular service provider's premise, the RX 122 may receive common cellular communication with text messages. In an Internet service provider premise, RX 122 and TX 126 may be the common means that are used for receiving and transmitting IP based communication between one or more users 110a-c and the IP operator.

[0034] TMS 124 may be a gateway for text communication between users 110a-c. TMS 124 may be used also as a gateway between the service provider network (TV, cellular, etc.) and the external network 150. In addition, TMS 124 may have other text applications; for example, it may support chat rooms, forums, text advertising, etc. In addition to its common operation, TMS 124 may be modified to forward text messages that are transferred via TMS 124 to database 132. TMS 124 may forward all the messages or selected portions of the transportation. Forwarding the text messages may be done according to the topic of the message. The topic may be defined by the chat room or the forum, or it may be defined by the user while creating the message.

[0035] In some exemplary embodiments, database 132 may receive input from additional sources, such as, but not limited to, another database that may contain a thesaurus of words that are frequently used in text messages or from another topic that is close to the topic of the database; in some cases, words may be added manually by the service provider, etc. In some embodiments, a user may provide his own thesaurus to the service provider. The service provider may add it to the appropriate database and/or to the appropriate thesaurus.

[0036] Database 132 may be divided into a plurality of DB sections. Each DB section may be dedicated to a topic. Each entry in the database may have a time stamp that indicates its time of receipt. The database may be configured to delete the oldest messages when necessary. The information from database 132 is retrieved by SP 134.

[0037] SP 134 may read a section of the database and statistically process it in order to generate an updated thesaurus for the topic that is associated with the retrieved DB section. Each thesaurus may be organized in a hierarchical structure. The first level may be associated with the first character of an entered word. The first level of each thesaurus may have an entry for each possible character. The second level may have an entry for each combination of the first character with a second character, etc.

[0038] Each entry in the thesaurus may have a list of suggested word or term completions that may complete the data entry. Each list may have few items; the number of items can be in the range of one to ten items, and each entry may have a different number of items. The number of items may be varied from one to a few items, such as, but not limited to, three, five or seven words. The completion suggestions are positioned in the list based on a computed indication of likelihood of being correct. The indication of likelihood of being correct may be a function of the number of appearances in

the DB section and the time stamp of each appearance. Newer information may have higher score than older information. The updated topic thesaurus then is transferred to the BOT 136, and the SP 134 starts updating the next topic thesaurus. The operation of SP 134 is disclosed in details below in conjunction with FIG. 4.

[0039] Another embodiment may give a score to each one of the words in the database. The score may be based on a combination of different criteria, such as, but not limited to, the number of appearances of the word in the database, the number of different users that utilize the word, or when the word was added to the database. Then a filter may be used for removing certain types of words. For example, a filter that removes dirty words, sexual words, curse words, etc. Such a filter may not be used for a thesaurus that is used in sexual chat, for example.

[0040] BOT 136 may comprise one or more thesauri, each one being dedicated to a topic. The thesauri may be updated and reflect the status of the data within the database at the time of the last update. Each thesaurus may be based on a collection of data from a plurality of users. When necessary, TMS 124 may retrieve the appropriate thesaurus from the BOT 136 and send it to the appropriate users.

[0041] FIG. 2 illustrates a block diagram with the relevant elements of a communication module (CM) 116 that uses an exemplary embodiment of the present invention in order to accelerate entry of text. CM 116 may comprise a receiver 210, a transmitter 220, a display interface 230, a processor 240, a keypad interface 250 and a memory 260. Memory 260 may be a non-volatile memory. The internal elements of CM 116 may communicate over bus 245. Bus 245 may be a TDM bus, ATM bus, IP based bus, etc. CM 116 may have audio capabilities (not shown in the drawings), such as audio decoder and encoder to communicate with the user.

[0042] For an interactive TV application, CM 116 may be a set-top box or other means of processing and transmitting communications of digital TV. Display 112 (FIG. 1) may be a TV set; keypad 114 (FIG. 1) may be the remote controller of the set-top box 116. Receiver 210 may be a tuner that is tuned to receive broadcast television video, to remove a television carrier signal, and to decode the audio/video signals. The decoded audio/video streams are transferred to the digital processor 240. Processor 240 may manipulate the signals (add text, graphics, animation, etc.) and send the manipulated signals via the display interface 230 to the TV 112 (FIG. 1). Digital processor 240 may execute a type of communication software that can access the SPP 120 via a transmitter 220. Transmitter 220 may be a cable modem for a cable TV or a common telephone modem for a satellite TV. The user interacts with the set-top box via remote controller 114. Usually remote controller 114 communicates with the set-top box 116 via infrared (IR) transmissions. Therefore, the keypad interface 250 is an infrared receiver for receiving the IR transmissions from the remote control unit 114 (FIG. 1). In another exemplary embodiment of the present invention, the keypad interface 250 may also be used for interfacing with a QWERTY keyboard and/or a pointing device such as a mouse.

[0043] In a cellular communication, the user's equipment may be a cellular phone with textual communication capabilities, a handheld computer having a cellular modem, or a similar device. Receiver 210 and transmitter 220 may be the common TX/RX of the cellular phone. Keypad interface 250 and display interface 230 are provided for coupling input keys 114 (FIG. 1) and display (a video or alphanumeric) 112, respectively, with processor 240.

[0044] Memory 260 provides storage for the software applications that can be executed by processor 240, as well as storage for temporary data and the current thesaurus that may be used. In addition to the common applications that are stored

in Memory 260, it may house a communication software program, such as a chat application, instant messaging, etc.; a keypad driver that may convert the keystrokes into characters for textual communication, or numbers depending on the current use of the keypad; and a software program and a current thesaurus that may accelerate entry of text according to an embodiment of the present invention.

[0045]

FIG. 3 illustrates a flowchart with the relevant steps of an exemplary method 300. Method 300 may be used for handling the database 132. Method 300 may be initiated 310 when database 132 (FIG. 1) is turned on and may run as long as the database is on. Method 300 may wait 320 to receive a message from TMS 124. Upon receiving a message 320, a time stamp is added to the message 325 and the appropriate section of the database is defined according to the topic with which the message is associated. Information about the topic may be received from TMS 124 with the message. The message then is converted into one or more storing strings. The message may be divided into separate words, and each word may be stored as a string. In some cases a combination of two or more words or symbols may be saved as a single storing string. For example, terms like "I love you", "Happy New Year", etc. that may be repeated in more than one message may be stored as a single storing string. Each storage string may receive the topic and the time stamp of the original message. Some words with one or two characters may not be kept as a storing string since there is no need to accelerate the tapping of short words. One or more strings may be stored 325 in the appropriate section of database 132.

[0046]

At step 330 a decision may be made whether there is enough storage space in database 132. If there is enough space, method 300 may return to step 320 and wait for the next receiving message. If there is not enough storage space, method 300 may delete some old storing strings, and then it may recheck 330 the storage space. Other embodiments of the present invention may use other criteria to delete

files. For example, when a topic is canceled (e.g. when a TV series is ended), the entire database section that is associated with that TV series may be removed.

[0047] The order in which the storing strings are organized in database 132 may be set according to different criteria. For example, the order may be alphabetic, or may reflect the receiving time or the popularity of the storing string, etc.

[0048] FIG. 4 illustrates a flowchart with the relevant steps of an exemplary method 400. Method 400 may be used by a statistical processor (SP) 134 (FIG. 1) for creating and updating one or more thesauri in BOT 136. BOT 136 may include more than one thesaurus per topic. The different types of thesauri per topic may be defined by the user's equipment type. The user's equipment may define the length of the thesaurus. Method 400 may be initiated 410 when SP 134 is turned on and may run as long as SP 134 is on. Method 400 may start a loop over the different thesauri in BOT 136. The loop starts at step 420 and ends at step 445. At step 425 a temporary storage place is defined for the current thesaurus.

[0049] SP 134 then may start processing the appropriate section of the database in order to create an updated thesaurus. Several methods may be used in processing the database. For example, a loop over all possible combinations of keystroke may be initiated. The loop starts from step 430 and ends at step 438. For each combination of keystrokes, the appropriate section of the database is searched for the storing strings that start with the current combination of characters. The combination may be of characters and numbers. Each combination may have a single character or number, two characters, three characters, etc.

[0050] Then the section of the database is searched 434 for storing strings that match the current combination. Each one of the matched strings is

retrieved, and an indication of the likelihood of being correct is calculated for each retrieved string. An exemplary method for calculating the indication may be the sum of the product of the number of appearances of the storing string by a factor that indicates the time stamp. The factor is higher when the time stamp is closer. For example, the factor may be one for a time stamp from this week or may be 0.5 if the time stamp is earlier than this week. A nother exemplary factor that may be used in addition to or instead of the time stamp is the number of different people that have used the term. A list then is prepared with one or more suggested completions. The number of suggested completions is dependent upon the number of matched strings that were found and the size limitation of the thesaurus that is currently in process. Based on this limitation, the found matched strings with the highest indication of likelihood of being correct are added to the list. The list is stored in the temporary storage space in the entry that reflects the current combination of keystrokes. Calculating the indication of likelihood of being correct may take into consideration some filters and may remove terms with higher scores because of the filter. For example, the filter may remove dirty words, sexual word, curse words, etc. The actuation of the filter may be dependent on the topic of the thesaurus.

[0051] At step 438 a decision is made whether the current combination of keystrokes is the last one. If it is, then the loop is terminated, and method 400 continues to step 440. If there are more combinations, then the next combination of keystrokes is selected and the method 400 returns to step 430.

[0052] After searching all the options of combinations of keystrokes, the temporary storage space contains the full updated thesaurus. Therefore the relevant old thesaurus in BTO 136 (FIG. 1) is replaced 440 by the updated thesaurus and the temporary storage place is released. Then a decision is made 445 whether the current thesaurus is the last one. If it is, then the loop is terminated and method 400 continues to step

450. If there are more thesauri, then the next thesaurus is selected and the method 400 returns to step 420.

[0053] Before starting a new cycle of updating the thesauri in BOT 136 (FIG. 1), method 400 may wait 450 for a certain period, T1. T1 may be defined according to different criteria or a combination of those criteria. For example, T1 may be a certain period of time (e.g. a day, a week, a month, etc.). T1 may reflect a quantity of new messages that have been received in the database in the period from the last update. In some cases T1 may be interrupted by a request from a user to receive an update thesaurus. After waiting 450, method 400 may return to step 420 and a new cycle of updating the thesauri at the BOT 136 starts again.

[0054] Other methods for selecting the appropriate words from the database to create a thesaurus may be used by exemplary embodiments of the present invention. For example, the size of the thesaurus may be defined according to the user's equipment. Then SP 134 (FIG. 1) may copy the appropriate section of the database to the temporary storage space, organizing the storing strings in the temporary storage according to their frequency of appearance, selecting the most frequent strings that can fit the required size of the thesaurus and deleting the rest. The frequent strings may be organized according to the different possibilities of keystrokes. For each possible combination of keystrokes, a list of suggested completions is prepared forming the updated thesaurus. Then the updated thesaurus may replace the old one in the BOT 136 (FIG. 1). Other embodiments of the present invention may use other methods to create and update the thesauri.

[0055] In other exemplary embodiments of the present invention, SPP 120 may not create and manage the list of suggested completions for each entry. The user's equipment may create and manage the list of suggested completions after each keystroke during the tapping of the message. The thesauri may include the most popular

words or terms as disclosed in the next paragraph. Each entry in the thesaurus may have a suggested completion and a score that is associated with the entry. The score may be based on a combination of different criteria, such as, but not limited to, the number of appearances of the term in the database, the number of different users that utilize the term, the time stamp that indicates when the term was added to the database, etc.

[0056] In such an embodiment, SP 134 (FIG. 1) may copy the appropriate section of the database to a temporary storage space, organize the stored strings in the temporary storage according to their frequency of appearance, selecting the most frequent strings that can fit the required size of the thesaurus and deleting the rest. The frequent strings may be organized according to the different possibilities of keystrokes and may be transferred to the BOT waiting to be sent to the user's equipment. The agent in the user's equipment that operates according to this exemplary embodiment may execute, among other tasks, a task for creating a list of suggested completions for each keystroke.

[0057] An exemplary task in the user's equipment may search the thesaurus for all the strings that match a search string. The search string reflects the last keystrokes combination. Then the agent may select one or more words to form the list of suggested completions. The terms in the list may be organized according to their score from the highest score to the lowest ones. The number of words in the list may be configured; a reasonable number can be in the range of few terms, such as, but not limited to, 3, 5, 10, etc. Then the list may be displayed to the user.

[0058] FIGS. 5a and 5b illustrate a flowchart with the relevant steps of an exemplary method 500. Method 500 may be used by system 100 (FIG. 1) during a text message session for accelerating the creation of the text message. Method 500 may be invoked 510 while starting a text message session. At the beginning of the session the topic of the session may be defined 513. The topic may be defined from the

address of the chat room or, in the case of an instant message session, method 500 may prompt the user to define the topic. If a topic is not defined, a general topic may be used. The general topic may use a general thesaurus that may be constructed from the words that are most frequently stored in the entire database 132. This thesaurus may reflect a general message and may offer an appropriate list of suggested completions. In addition to the topic and the size of the thesaurus, a user may request the TMS 124 to avoid transferring the user's messages to database 132. At step 516 the topic of the session and the requested size of thesaurus may be transmitted to SPP 120. The size of the thesaurus may be defined by the user's equipment type 110 (FIG. 1).

[0059]

A decision then is made 520 whether a thesaurus has been received. If it has not been received, a decision is made whether 530 the next keystroke is a beginning of a word. If not, system 500 may wait 532 for a period of T2 and returns to step 520. Period T2 may be in the range of few seconds to few minutes. If 530 the keystroke is the beginning of a word, then the tapped character is added 534 to the string of the message and is displayed on display 112, and method may wait 535 for the next keystroke.

[0060]

Upon receiving the next keystroke, the keystroke is analyzed. If the next keystroke is a character 536, then method 500 may return to step 534. If the keystroke indicates end of word 539 (e.g. comma, full-stop, space, etc.), then the keystroke may be added to the string of the message and may be displayed. The method 500 may return to step 520, if the keystroke is any other 537 command, such as send, move up, move down, etc. Method 500 may respond 538 to the keystroke and follow the user's instructions. For some of the keystrokes, at the end of responding to the keystroke method 500 may return to step 520. For other keystrokes, method 500 may be terminated after responding to the keystroke.

[0061] In another embodiment of the present invention (not shown in the drawing), the user may hold and be unable to continue typing the message until a thesaurus is received. In such an embodiment if a thesaurus is not received, the present invention may wait for a period of T2 and recheck the existence of a thesaurus. The loop may continue until a thesaurus is received or until the end of the text session.

[0062] If 520 a thesaurus is received, then method 500 may continue to step 540 (point 'A' in FIG. 5b). The thesaurus may be transmitted from SPP 120 to the user's equipment by using different methods. The different methods depend on the type of the network between the user's equipment 110 and the SPP 120 (FIG. 1). For example, in interactive TV network, a carousel transmitting method for broadcasting the plurality of thesauri is used. The agent in the user's equipment may listen to the carousel broadcasting and wait for the appropriate thesaurus. Upon receiving the appropriate thesaurus, the agent stores it.

[0063] In case of a cellular network the thesaurus may be sent privately to the user's equipment over the cellular connection 144 (FIG. 1). The thesaurus may be sent in response to the user's request 516 to a thesaurus that fits the topic of the session.

[0064] At step 540 the method may wait for the beginning of a word or term. Upon receiving keystroke that initiates a word or a term, the character of the keystroke is added 542 to a current message string or may initiate a new message, and the character is displayed. Then a search string is set 544 reflecting the keystroke.

[0065] A search engine is initiated, and the search engine may search 546 the thesaurus for an entry that matches the search string. If 550 an entry that matches the search string has been found, then the list of suggested completions

that is stored in that entry may be displayed. The list may be displayed near the relevant keystroke, and method 500 may wait 554 for the next keystroke. If 550 an entry in the thesaurus was not found, then method 500 may proceed to step 554 and waits for the next keystroke.

[0066] In another exemplary embodiment of a user's equipment, the search engine may search the thesaurus for all the strings that match the search string. Then the agent may select one or more terms from the entries that have been found to form the list of suggested completions. The terms in the list may be organized according to their score from the highest score to the lowest ones. The number of words in the list may be configured; a reasonable number can be in the range of few terms, such as, but not limited to, 3, 5, 10, etc. Then the list may be displayed to the user.

[0067] Upon receiving 550 the next keystroke, the type of the keystroke is analyzed. If the keystroke is a character or a number 560, then the character of the keystroke is added 562 to a current message string and is displayed over display 112 (FIG. 1). The string of the character is added 564 to the old search string and the new search string reflects the combination of the characters that have been typed. Method 500 returns to step 546 with the combined string and the search engine starting a search on the combined search string.

[0068] If the keystroke indicates the end of word 570 (e.g. comma, full-stop, space, etc.), then the keystroke may be added to the string of the message and may be displayed. Method 500 may return to step 540, waiting for the beginning of a new word or term to be tapped.

[0069] If the keystroke is any other 570 command, such as send, move up, move down, etc., then method 500 may respond 558 to the keystroke and follow the user's instruction. For some of the keystrokes, at the end of responding to the

keystroke, method 500 may return to step 520 or 540. For other keystrokes, method 500 may be terminated after responding to the keystroke. In some cases method 500 may return to step 554 and wait for the next keystroke. For example, if a suggested list is displayed and the keystroke is moved up or down, then the agent may respond by moving the cursor accordingly. Method 500 then may return to step 554, waiting for the next keystroke.

[0070] If the keystroke 574 indicates that one of the suggested completions has been selected. For example, tapping the '#' key in keypad 114 (FIG. 1) may indicate that the suggestion which is currently pointed by the cursor is selected by the user. Then the selected suggestion is added 576 to a current message string, is displayed over display 112 (FIG. 1), and method 500 may return to step 540 waiting for the beginning of a new word or term to be tapped. In some cases, at the end of a suggested term, a space character may be added automatically.

[0071] In this application the words "unit" and "module" are used interchangeably. Anything designated as a unit or module may be a stand-alone unit or a specialized module. A unit or a module may be modular or have modular aspects allowing it to be easily removed and replaced with another similar unit or module. Each unit or module may be any one of, or any combination of, software, hardware, and/or firmware.

[0072] In the description and claims of the present application, each of the verbs, "comprise", "include" and "have", and conjugates thereof, are used to indicate that the object or objects of the verb are not necessarily a complete listing of members, components, elements, or parts of the subject or subjects of the verb.

[0073] The present invention has been described using detailed descriptions of embodiments thereof that are provided by way of example and are not intended to limit the scope of the invention. The described embodiments comprise

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different features, not all of which are required in all embodiments of the invention. Some embodiments of the present invention utilize only some of the features or possible combinations of the features. Variations of embodiments of the present invention that are described and embodiments of the present invention comprising different combinations of features noted in the described embodiments will occur to persons of the art. The scope of the invention is limited only by the following claims.

What is claimed is:

1. A method of accelerating entry of a text message by a user in a textual communication, the method comprising:
 - a. receiving from a server a current updated thesaurus;
 - b. storing the current updated thesaurus;
 - c. waiting for the first character of a word to be entered by the user, displaying the first character, and defining a search string that reflects the first character;
 - d. searching the current updated thesaurus for an entry that matches the search string;
 - e. checking if the entry is found, if yes then displaying a list of suggested completions that is associated with the found entry;
 - f. checking if one of the suggested completions is being selected by the user; if yes, then adding the selected completion to the text message.
2. The method of claim 1, wherein step 'e', further comprising returning to step 'c' and waiting for the next word if an entry is not found.
3. The method of claim 1, wherein step 'f', after adding the selected completion further comprising returning to step 'c' and waiting for the next word.
4. The method of claim 1, further comprising:
 - g. waiting for the next keystroke, if the next keystroke is a character then updating the search string by adding the next character to the search

string; and performing steps 'd' to 'f' in claim 1 for the updated search string.

5. The method of claim 1, wherein the received thesaurus fits the topic of the text message.
6. The method of claim 1, wherein the size of the received thesaurus comprises terms that are combinations of numbers and characters.
7. The method of claim 1, wherein the server from time to time updates the thesaurus while it is stored in the server.
8. The method of claim 1, wherein the one or more of the suggested completions are terminated with a space.
9. A method of preparing and managing one or more thesauri at a server in a service provider's premises, wherein one or more thesauri are used for accelerating the entering of a text message via a character input device by a user in a textual communication, the method comprising:
 - a. receiving a plurality of text messages;
 - b. storing the received text messages in a database;
 - c. preparing a thesaurus;
 - d. continually updating the thesaurus according to the most current information that is stored in the database;
 - e. responding to a request from a user by transmitting an updated thesaurus.
10. The method of claim 9, wherein storage, including defining the topic of the received text messages and storing, is done in a section of the database that is associated with the topic of the text message.

11. The method of claim 10, wherein preparing a thesaurus is done for each topic in the database.
12. The method of claim 11, wherein in responding further comprises the selection of the transmitted thesaurus based on its associated topic.
13. The method of claim 11, wherein in responding further comprises selection of the transmitted thesaurus based on the user's equipment.
14. The method of claim 9, wherein the character input device selected from the group consisting of writing pens, touch screen displays, QWERTY keyboards, keypads, mouse and voice recognition.
15. A server for providing one or more thesauri to a plurality of users, the server comprising:
 - a. a database operative to store text messages that are received by the server;
 - b. a statistical processor operative to retrieve, from time to time, a section of the database, and then to process the retrieved section of the database in order to create an updated thesaurus of terms having high likelihood of being correct;
 - c. a bank of thesauri being operative to receive and store the updated thesaurus from the statistical processor and deliver a requested thesaurus upon request.

Fig. 1

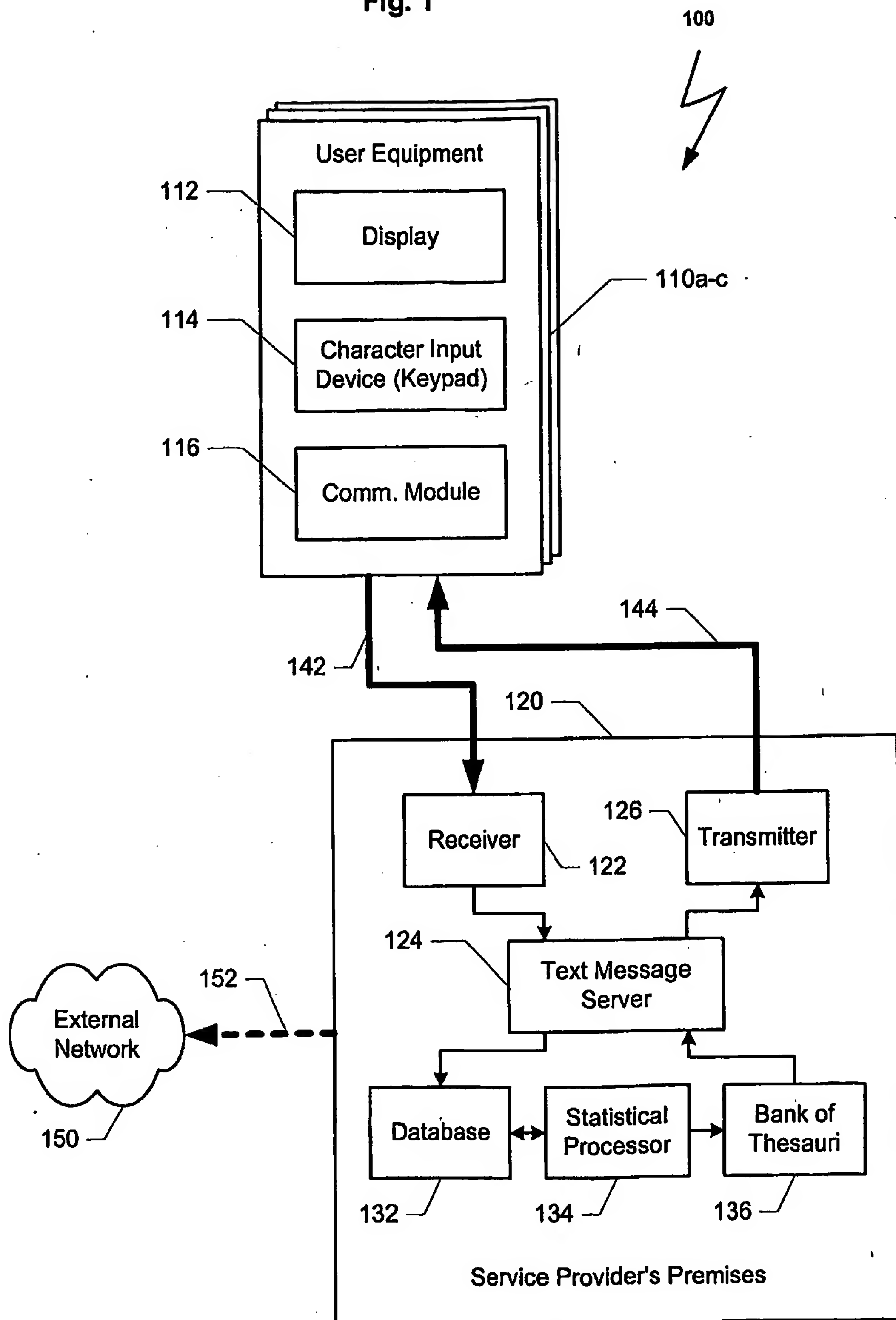


Fig. 2

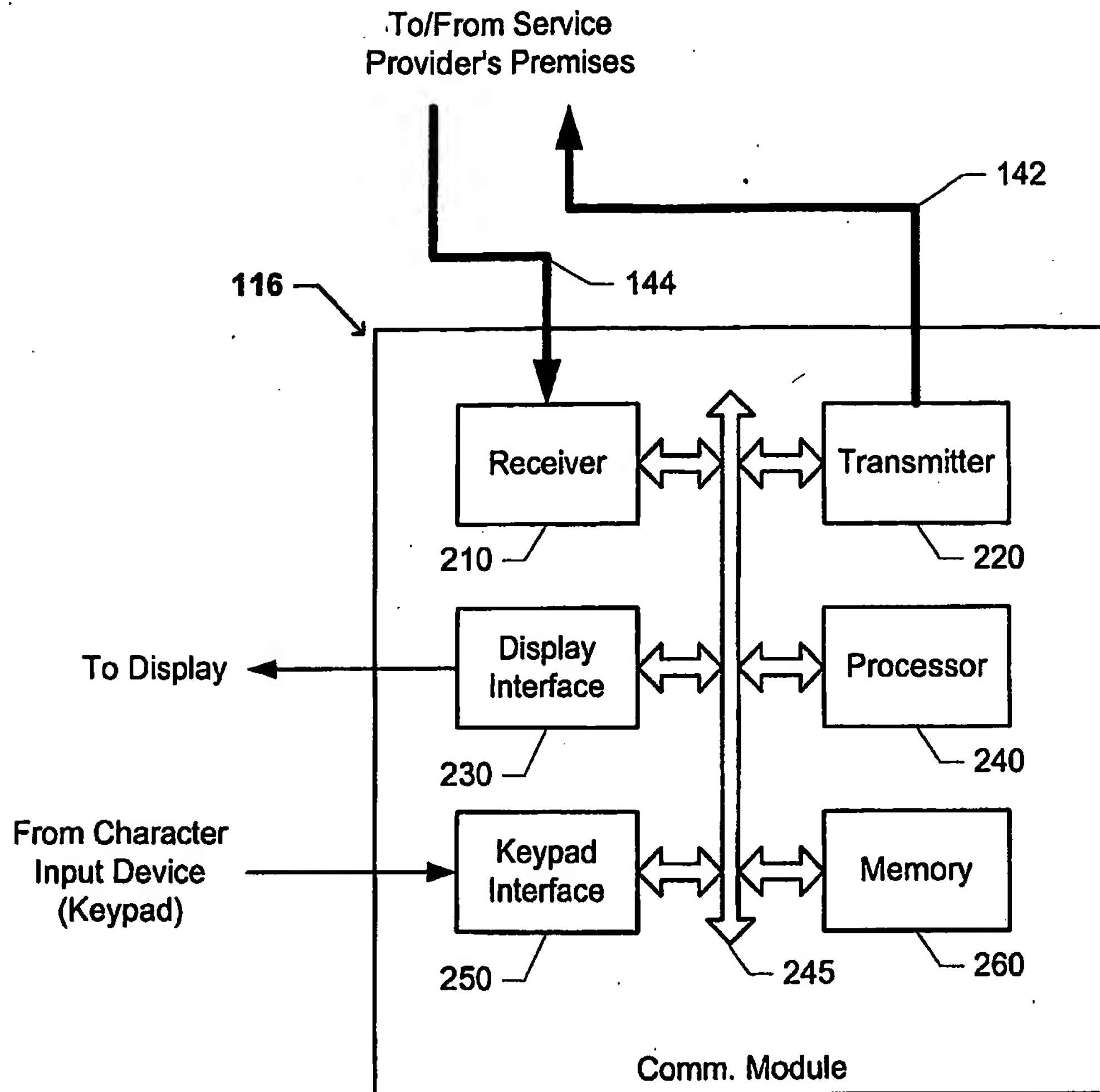


Fig. 3

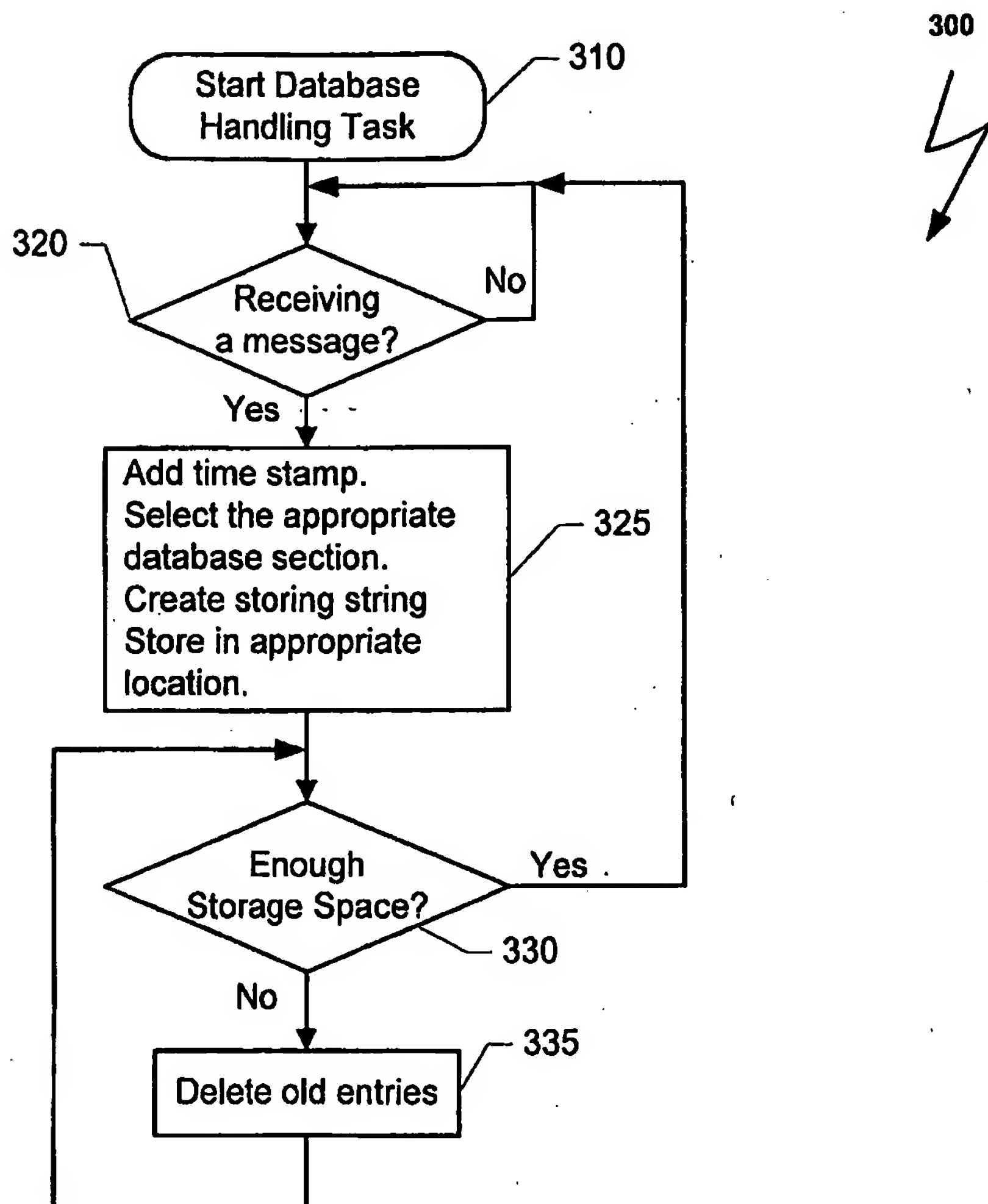


Fig. 4

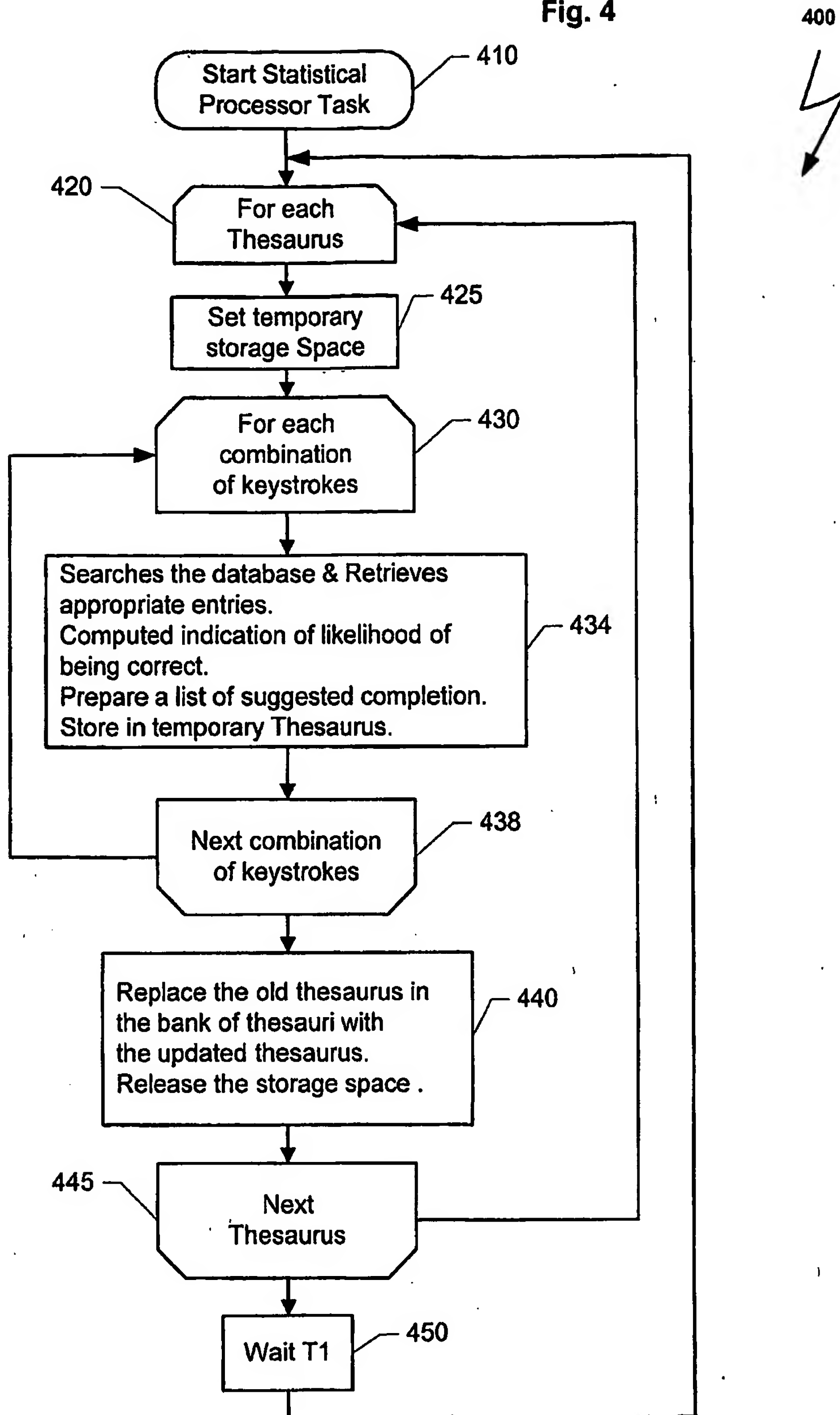


Fig. 5a

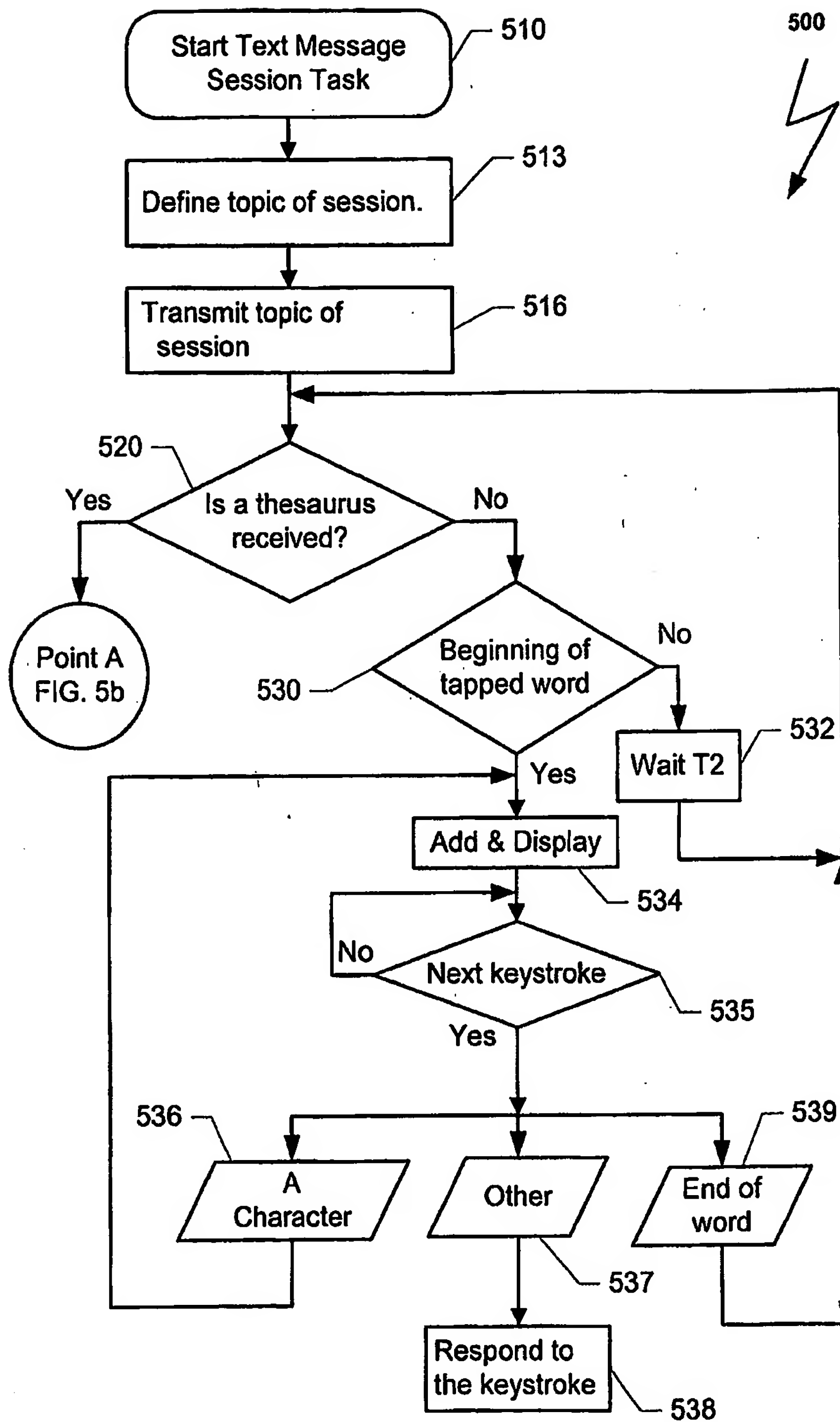


Fig. 5b

